Introduction

Improvements in equine dental equipment have allowed the practitioner to diagnose, treat and manage various dental conditions with the utmost care for patient comfort and safety. While hand instruments still dominate, the use of motorized equipment is fast becoming a part of routine dentistry. Motorized equipment allows the practitioner to perform various dental procedures faster and more efficiently (e.g., reducing a wave mouth) than hand equipment. Additionally, motorized equipment has the potential to be less traumatic than hand tools to surrounding soft tissue. However, as with all advances, motorized dental equipment has its limitations dependent upon equipment selection and practitioner's experience.

Pneumatic

Pneumatic (air driven) equipment has several advantages with the most distinct being the lack of electrical parts in close proximity to the horse and operator. The hand piece used is a modified air die file grinder or reciprocating saw, which has a short quarter-inch length, stokes which reduces the chance for soft tissue damage and is superb for working in the caudal oral cavity. The length of the shaft and the float head comes in different sizes and angle. The float blade can either be attached directly to the head (with glue) or screwed, thus interchangeable, and solid carbide in design.

A compressor is required to operate the pneumatic float, which can be self-powered (gasoline) or electrical. In either case the compressor should be located at a distance from the area of floating to reduce noise pollution.

The self-powered compressors allow the veterinarian to perform equine dental procedures in most locations but produce more noise and required more maintenance than electrical operated compressors. In addition, this type of compressor requires oil, which may allow it to last longer but frequently develop oil leaks with time.

Electrical powered compressors run quieter, but still can be loud, than self-powered units, do not require oil but have the potential to cause electrical problems (trip breakers) in some barns.
In either case the compressor must produce at least 4.5 cfm (cubic feet per minute) to sustain the operation of the dental unit. It is important to decide in selection if the practitioner desires a portable or stationary compressor and how the compressor will be transported.

Pneumatic handpieces vary in shape and size and the practitioner is encouraged to try the hand piece for comfort in regards to size and weight and the degree of hand-piece vibration. The air exhaust of the handpiece is existed directly out of the handpiece or a hose is connected to the air outlet and the exhaust air is allowed to exist several feet away from the handpiece. This will reduce the noise level at the handpiece and allow the practitioner to work quieter near the horse.

The slime nature and short stroke of the pneumatic floats allow excellent use in the caudal part of the dental arcade. They are particular suited for use in small-headed horses, ponies, miniatures and horses with heavy massiter muscles, e.g., Quarter horses. Traumatic damage to the mouth is minimal with most.

Limitations may include heavy sedation of the horse if intraoral placement of one of the practitioner's hand on the float shaft is practice. The practitioner's hand inside the mouth may need to be lube to keep the float shaft from causing friction burns to the practitioner's hand during operation.

Pneumatic instruments do require the use of an inline oiler and filter to lubricate and protect the pneumatic handpieces from debris, e.g., rust from the inside of the air tank. The oiler and filter should be located near the compressor.

**Rotary Disc Grinders**

There are several types of rotary disc grinders on the market now. They consist of a modified drill (see figure) attached to an extended shaft with a rotary disc attached at a right angle.

The drills can be either electric, battery or pneumatic driven with each having various advantages over the other.

Table 1. Rotary Disc Grinders

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<th>Advantage</th>
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<td>Electric</td>
<td>- Usually more</td>
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The rotary disc can be made of a carbide chip (fine, medium or coarse), solid carbide or diamond blade. The diamond and solid carbide disc provide a more efficient cutting surface. However, the coarser the carbide chip blade the more ‘bounce’ to the float head and the coarser the solid blade the more tooth removed. Either disc will float a number of horses (a few hundred) before it needs to be replaced. Safety glasses should be worn as new disc frequently throw out small pieces of teeth that may lodge in one’s eye.

Tissue damage from a rotary disc is minimal. Depending upon the model purchase maintenance varies from just wiping down with an alcohol-wet gauge to greasing bearings in the float heat. The drill motor will most likely have to be replaced every few years.

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**Flex-Cable Grinders**

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1 Rounds per minute
Flex-cable grinders (commonly referred to as Dremels™) were one of the first equine power tools to come on the market. The flex-cable grinders allow the adaptation of various types of rotary heads (burrs) of which most are carbide. The flex-cable grinders have the potential for high RPM that can reach significant speeds that produce considerable heat and dust. The most common way to manage the heat and dust is via some type of water irrigation onto the head of the cutting burr or vacuum attached to the shaft of the tool. While this reduces the heat and dust, it does produce a watery waste from the horse’s mouth that often makes a mess of the working area.

Some manufactures remove the dust via a vacuum system that is attached to the flex-cable grinder. This system does nothing for the heat that is produce and produces noise. And is just another piece of equipment to move about.

The biggest disadvantage to any flex-cable grinder is the potential for soft tissue damage and excessive tooth removal. If the flex-cable grinder is not equipped with a built-in clutch or shear pin, the burr may grab tissue in inexperience hands.

Most flex-cable grinders, in use, are electric and thus the potential for electrical concerns exist. Recently pneumatic one has come on the market.

The burr attachments come in various lengths and grit. Most manufactures produce a guard for the burr head to protect the soft tissue of the mouth. The degree of guard (amount of the burr that is covered) limits the cutting surface of the tooth and the amount of tooth that can be removed at any one time.

The cutting burrs are either carbide or diamond coated. The carbide burrs are usually disposed of when dull and are not resharpen. Maintenance is minimal with flex-cable grinders with the exception of keeping tooth debris clean out of the cutting head in those that are equipped with a water-cooling source.

**Reciprocating**

Reciprocating equine dental floats are been around for a number of years and like any other dental tool are very effective in the hand of an experience practitioner.

The reciprocating unit can be either a battery charged or electrical. The battery-equipped units are heavier than electrical and have less strokes per second than electrical. The most important thing to consider when selecting a reciprocating dental unit is the stroke length of the tool. Shorter stroke lengths of 1/2 inch or less are best. Dental units with long stroke length have more potential for injury when working in the caudal aspect of the mouth.
These types of dental units do not produce any heat but do produce a lot of vibration. The units can be equipped with either carbide chipped or solid carbide blades. The actual float shaft varies in length and sharp depending upon manufacture and closely mimics that of hand floats. These dental units require no maintenance other than cleaning. The biggest disadvantage is these unit are often heavy and can be cumbersome to use.

Summary

The potential for tooth damage due to heat generation has been implied but not proven in a clinical situation. While most are in agreement that the potential for damage is there, no clinical case of dental disease due to thermal damage has been documented.

Most importantly is that the practitioner should always wear eye protection as tooth particles frequently fly out of the mouth, ear protection to prevent hearing damage and with tools that produce dust an air mask to prevent inhalation of fine dust particles.

There are several things to consider when one is going to purchase dental equipment. What percentage of the practice is going to be devoted to dentistry? In most cases the practitioner is looking to maintain or expand the dental caseload. What level of dentistry is going to be practiced? Who is going to do the dentistry, one or more individuals of the practice? How often will they be available? Will there be a specific ‘dental day’? What is the training of the individuals? Will the practice provide continuing education to augments the learning curve that new equipment often entails?

How often will the dental equipment be used? Daily or once weekly? How much space will be needed to perform the dentistry and where inside the practice will the dentistry take place? Is there a station or secure location to perform the dentistry? What type of flooring is present? Is there a drain to allow water drainage to prevent pooling? If pneumatic equipment is selected is the air compressor going to be located outside the building or will a portable unit have to be moved into the hospital? Remember the noise of the compressor when making this decision.

Is your dentistry going be mobile? How much mobile space will be allotted on the ambulatory truck for dental equipment? How much maintenance will the equipment need and who will do it? How much capital is available to purchase the dental equipment?

Lastly, regardless of the type or model of motorized dental equipment selected the practitioner must keep in mind that each piece of equipment has a learning curve, some more than others, and time should be allow for learning.